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GUIDELINES: WATER QUALITY MANAGEMENT PLANNING

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GUIDELINES

WATER QUALITY

MANAGEMENT PLANNING

NOTE: Unified planning requirements for the EPA Waste Water Treatment Works Construction Grant Program and HUD Water and Sewer Facilities Grant Program are currently under preparation by both agencies. In the interim period, these Preliminary Planning Guidelines provide the basic considerations to be addressed in meeting the requirements of both organizations.

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
WASHINGTON, D. C. 20460

January 1971

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PLANNING GUIDELINES

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CHAPTER 1. APPROACH TO WATER QUALITY MANAGEMENT PLANNING

1. GENERAL.

a. Effective plans are an essential part of the process of establishing, implementing and maintaining water quality standards. The national objectives and goals of the water quality standards, supported by the extensive financial assistance program for the construction of municipal waste treatment facilities determines both the immediate and long-range objectives of water quality management planning. For the immediate period these are:

(1) To assure an acceptable level of certainty that water quality standards implementation plans (See Appendix 1-A) will achieve in-stream goals; and

(2) To maximize the cost effectiveness of investments in pollution abatement and prevention actions required to achieve national water quality objectives.

b. The long-range objectives are to improve and maintain established water quality standards. Continuation of the planning process will attain these objectives by periodic updating of adopted plans. In addition there is a definite need to determine measures that would: control all sources of pollution and improve management of receiving waters to reduce adverse impacts of wastes; maximize the cost effectiveness of measures needed to achieve this higher level of water quality management; and relate water quality management more effectively to all other environmental protection and resource use and management programs.

2. PURPOSE.

a. These guidelines delineate the general policies, procedures and requirements for development of the necessary plans and the evaluation of the effectiveness of the developed plans in meeting national water quality objectives. Primary emphasis is given to the actions necessary to implement current regulations (18CFR601.32 and 33) on grants for water pollution control. These regulations (Appendix 1-B) were published on July 2, 1970, and require that any municipal waste treatment facility or interceptor sewer receiving grant support under Section 8 of the Federal Water Pollution Control Act, as amended, be

included in a basin plan, and where appropriate, also a metropolitan/regional plan. The purpose of these regulations is to insure that:

(1) The massive construction grant investment to which the Federal Government is committed is cost effective;

(2) The investment will be supplemented by actions to abate other sources of pollution; and

(3) The investment will provide maximum protection and enhancement of water quality.

b. The States and their political subdivisions have primary financial responsibility for water pollution control and are assigned the basic responsibility for this expanded planning effort. The Federal role is primarily one of assistance, guidance, and evaluation.

c. Under the regulations, planning is required in two distinct but related geographic areas:

(1) The basin hydrologic system into which liquid wastes are discharged or ultimately flow (basin plan).

(2) The urban concentration and/or grouping of small cities metropolitan/regional plan).

d. Where such plans do not presently exist, a certain amount of time will be needed to develop them. Therefore, procedures are provided in paragraph 7 of these Guidelines on the development and evaluation of interim plans based on available information which can be used while States and communities develop detailed plans. These interim procedures are not to be used after July 1, 1973.

3. APPLICABILITY. These Guidelines apply to Federal, State, interstate, and local planning agencies concerned with development of water quality management plans required by 18CFR601.32-3. Chapters 4 and 5 are applicable mainly to organizational elements of EPA which are concerned with development, management, and coordination of the programs of the agency.

4. POLICY.

a. Implementation of Regulations, 18CFR601.32-3 leading to the development of an effective water quality management planning

process will be accomplished in accordance with the Guidelines contained herein.

b. All necessary steps will be taken to encourage the development of required plans by the States and political subdivisions (general purpose units of government) where regulatory and other authorities can assure implementation of the plans. For those problems of interstate areas, appropriate interstate mechanisms must insure necessary coordination among the respective interests.

c. Planning under the regulations will identify the need for States to update and improve established water quality standards (methods for revising water quality standards are set forth in appendix 1-C).

d. The planning requirements for Federal waste water collection and treatment grant programs will be unified. Through EPA and HUD planning requirements as implemented by these Guidelines and the HUD Areawide Planning Requirements, grants awarded by HUD for Water and Sewer Facilities must meet the same administrative and regulatory requirements with respect to comprehensive planning and functional waste water collection and treatment planning and programming.

e. The following areawide (metropolitan and regional) planning determinations are to be made prior to any EPA or HUD grants for waste water collection or treatment facilities.

(1) That there is adequate long-range comprehensive planning for the area, carried out by an officially recognized areawide planning agency, which provides a basis for areawide waste water collection and treatment functional planning.

(2) That there is, consistent and coordinated with comprehensive planning, adequate planning for long-range waste water collection and treatment facilities for the area which sets forth the basic framework of the functional system of which the proposed project is a part.

(3) That, consistent with comprehensive and functional planning, there is an adequate short-range program for a unified or officially coordinated functional waste water collection and treatment system for the area.

(4) That the project to be assisted is consistent with the planning and programming called for under (2) and (3) above.

5. REFERENCES. The following references provide the authorities on which various paragraphs of these guidelines are based.

a. Federal Water Pollution Control Act, 33 U.S.C.A. 1151 et seq.(1970).

b. National Environmental Policy Act of 1969, P.L. 91-190.

c. Executive Order 11507 (1970), Federal Facilities.

d. Executive Order 11514 (1970), Environmental Quality.

e. Grants for Pollution Control, 18CFR601.32-3

f. BOB Circular A-85 and A-95.

g. Reorganization Plan No. 3 of 1970.

h. Environmental Assessment of FWQA Actions, FWQA Order COM 3200.1.

i. Areawide Planning Requirements, Department of Housing and Urban Development, HUD 6415, issuance series.

6. FUNCTIONAL PLANNING FOR WATER QUALITY. Water quality management planning is intended to provide for continuous, systematic and coordinated development of an efficient and effective course of action to protect or enhance the quality of the waters of a discrete area. The guidelines identify two categories of plans: basin and metropolitan/regional or areawide plans.

a. Basin Plans. The basin plan provides an overview of the impact of pollution sources and alternative pollution control measures on the receiving waters, basic information on stream flows and water quality, and requirements for jurisdictional cooperation at various levels.

(1) A basin is here defined as either:

(a) A hydrologic area or that portion thereof located within an individual State and having boundaries mutually agreed upon by the State and EPA (see paragraph 8.a for interstate basins); or

(b) The hydrologic area within the jurisdiction of an interstate agency, where such jurisdiction includes authority to implement the plan through substantially the same powers as those

possessed by the member States.

(2) The State is to designate the agency responsible for basin planning, and where there are exceptions to "a" and "b" above, these are to be resolved between the State and EPA.

b. Areawide (Metropolitan/Regional) Plans. These areawide functional plans are subsets of the Water Quality Management Plan for a river basin and are the functional waste water collection and treatment (sewerage) plan elements of the comprehensive areawide Plan as set forth in the HUD Areawide Planning Requirements (see paragraph 5.i). These guidelines place primary emphasis on regional waste water management systems as well as the location and capacity aspects of the collection system. Such systems mean one or more treatment works which provide integrated, but not necessarily interconnected waste disposal for a community, metropolitan area or region. Metropolitan areas and regions are to be designated by the States and concurred in jointly by HUD and EPA as Areawide Planning Jurisdictions (APJ's) guided by the HUD Areawide Planning Requirements.

(1) A metropolitan APJ is defined generally as a Standard Metropolitan Statistical Area (SMSA) as defined by the Office of Management and Budget. Further explanation of a metropolitan APJ is contained in the HUD Areawide Planning Requirements (see paragraph 5.i.)

(2) A regional APJ is defined as a geographic area, other than a metropolitan area as defined above, encompassing or extending into the jurisdiction of more than one unit of local, general government and mutually agreed upon by the State(s) concerned and EPA as requiring integrated regional water quality management.

c. Planning Organization.

(1) Areawide Planning Organizations. The EPA Regional Office, jointly with the HUD Area Office and with the governor or his designee will recognize Areawide Planning Organizations (APO's) guided by the HUD Areawide Planning Requirements.

(2) Basin Planning Organizations. States will designate as appropriate the basin planning organization. Coordination is necessary between Areawide Planning Organizations and Basin Planning Organizations. It is suggested that in those instances where the APO's in the Basin are not represented in the Basin Planning Organization, that a committee structure be established as part of the Basin Planning Organization

as a mechanism for coordination. Where Basin Planning Organizations are not established, the State agencies responsible for river basin water quality planning are encouraged to establish planning advisory committees for each river basin with representatives from the APO's within the river basin. The purpose of these committees will be to provide liaison on policy and other matters between the APO's and the State agency and to coordinate areawide (metropolitan and regional) planning with basin water quality planning. State agencies are encouraged to furnish technical assistance to such planning advisory committees and to give due consideration to their recommendation and proposals with respect to policies, priorities and projects to be incorporated into the river basin water quality plan.

d. Plan Relationships. The metropolitan/regional plan must be consistent with the areawide comprehensive plan and the basin plan and all must consider the environmental impact of the implementation of the plan. Ideally, basinwide information on flows, water quality, and major proposed measures (solutions) would be developed first. This, in turn, would be used by regional planners in evaluating growth patterns and regional configurations. The basin planner would then integrate and suggest any refinements. In practice, basin planning will draw on existing metropolitan/regional plans for information on sources and solutions. Figure 1-6.1 illustrates the relationship among basin, regional and metropolitan plans. A separate regional plan will not be necessary where EPA has agreed to the State's request to submit only a basin plan, if the basin plan gives firm assurance that adequate coverage is given to relevant regional plan elements, and:

(1) Waste discharges in a planning area do not affect water quality outside of area;

(2) Waste discharges have no interaction within the basin;

(3) Population is scattered and isolated and insufficient to require regional consideration for water quality management;

(4) No major population or economic expansion is expected in the next five years; and

(5) Basin plan will provide adequate coverage of pollution sources within the EPA.

e. Plan Content. A major objective is to establish a logical, systematic water quality management planning process which includes land and water planning and organizational and financial arrangements

WATER QUALITY MANAGEMENT PLAN RELATIONSHIPS

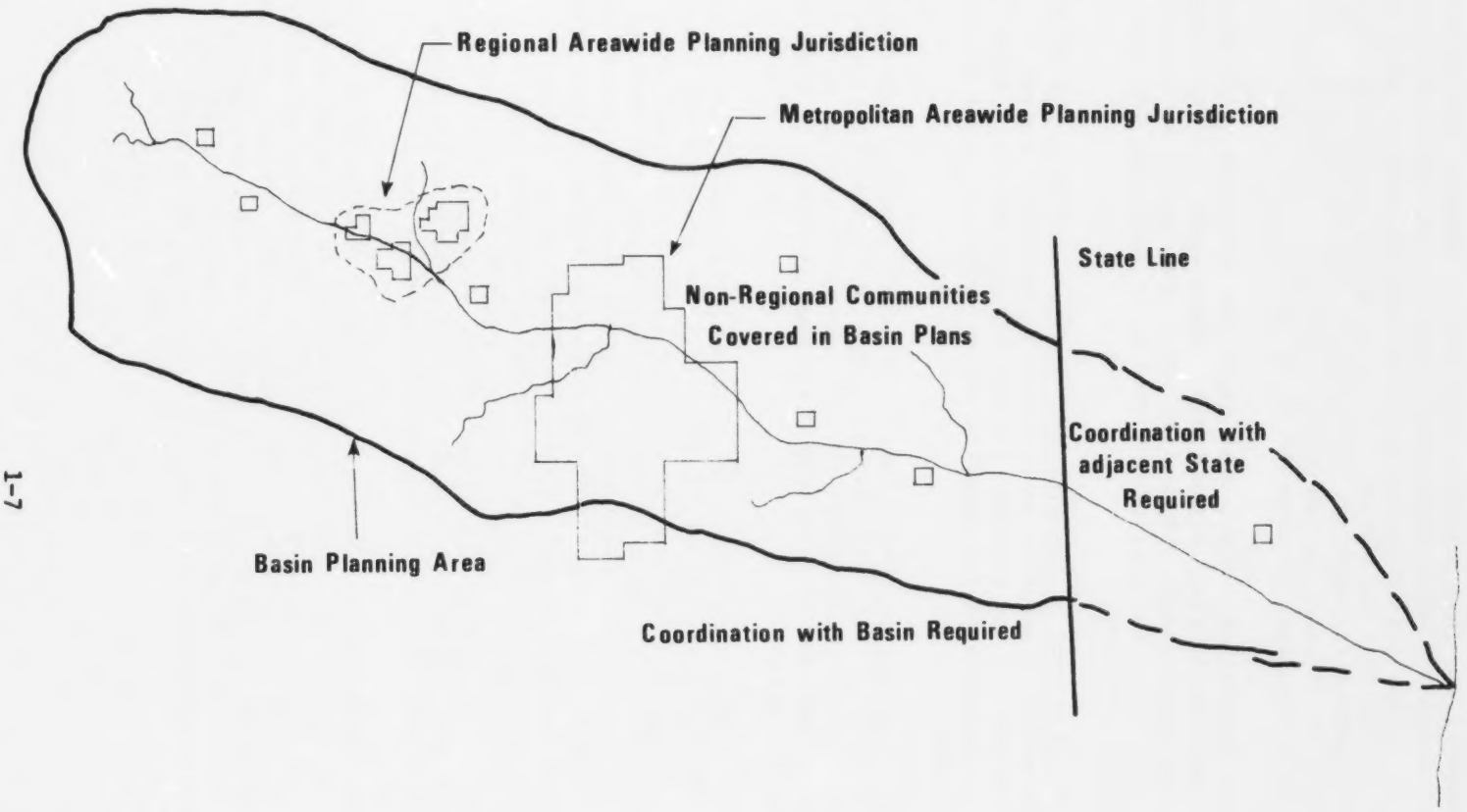

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Figure 1-6.1. Plan Relationships

for implementation. This planning is a viable, dynamic, and constantly improving process including evaluation, feedback and coordination with a variety of local, regional, State, interstate and Federal agencies. There must be distinct milestones in time to avoid continuing postponment of conclusions for want of "more data." The following general coverage will be provided in the planning process. (A more detailed description is contained in Chapters 2 and 3).

(1) Objectives. State what water use goals are to be achieved and the objectives to reach these goals. Where water quality standards have not been established, the desired water uses should be established by public hearings. Where standards need to be upgraded, the plan should propose revisions.

(2) Statement of the Problem. Analyze concisely the nature of the problem(s): impact on water quality, geographic extent, social (demographic) and economic forces, the various waste loads and technical considerations for handling these loads, and rates of change in the problems.

(3) Planning Premises. Set forth major premises upon which the plan is based. This would include legislative authority, specific local conditions, institutional problems, resources such as matching grants and achievement of goals and objectives set forth in areawide comprehensive planning.

(4) Alternative Solutions. Various strategies (plan of action) to reach the objectives set by (1) above will be analyzed and reported in detail. Proposed solutions may include various treatment measures, process changes, in-stream measures, flow regulation, and land use policies. Evaluations of abatement/prevention plan alternatives should present information on such factors as impact on water quality, capital and operation and maintenance costs, probability of achieving the desired results, and differences in social and economic impacts. Environmental impacts of the alternatives studied will be assessed for both benefical and detrimental effects (such as compatibility with recreational uses, historical sites, etc.) Evaluation of alternatives will consider both tangible and intangible benefits and costs.

(5) Water Quality Management Strategy. A strategy will be presented for achieving the objectives proposed in (1) above on the evaluation of the strengths and weaknesses of relevant alternatives in (4) above. The selected strategy should contain specific proposals for implementation of water quality standards or water use goals, including public and private responsibility, laws and ordinances, organizational arrangements, financing, schedules, priorities

and environmental impact. The strategy should also discuss the availability of needed resources such as manpower (both types and number), financial assistance, and materials (that might be in short supply).

f. Plan Evaluation. The agencies responsible for developing the water quality management plan will insure a continuing evaluation of the plan for the purpose of measuring the performance, changing plan objectives as necessary to meet State and national goals, and refining the plan in the light of new technology. In no case will a plan be considered acceptable by EPA if the actions proposed would fail to result in attainment of water quality standards as set forth in the implementation schedule.

(1) The basin plan should provide the main input on hydrology, location and characterization of waste sources (including storm water, combined sewers, non-point sources), treatment levels (present and future), water quality effects (present and future), land use, basin-wide alternatives (such as transbasin diversions, flow augmentation) and basinwide priorities for construction.

(2) The metropolitan/regional plan should provide the main input on land use, growth, estimated waste production, process design, service areas, collection systems, sewer drainage areas, investigation of local and regional alternatives, cost estimates, financing and institutional arrangements. If no metropolitan/regional plan is to be prepared, the basin plan should then include the expected environmental impacts of any projects proposed for the basin.

7. INTERIM PROCEDURES. Areas requiring plans as a prerequisite for the approval of Federally funded construction projects may use interim procedures prior to July 1, 1973. Interim procedures serve the purpose of reconciling lead time for planning with the existing implementation schedules and flow of construction projects. At the same time, interim procedures must assure that immediate and near future decisions on construction projects as well as on development proposals affecting future land use and water quality reflect the best available planning judgement and evaluation. Every effort should be made to schedule interim planning to lead in a logical sequence toward the fully developed plans within the least possible amount of time. Reasoned judgment will have to be made to determine the scope and detail of an interim plan based on the planning goals, problems, and information needs in each particular situation. The approach to basin and metropolitan/regional plans in paragraph 6 is to be used in preparing interim plans. Plans developed during the interim period should address

each of these elements, and should respond to major items. These plans will not, of course, be as complete or have the same degree of detail as a fully developed plan. The governing factors are the critical nature of pending decisions, the type, quality, and amount of available information, and the amount of time available to present relevant planning information for orderly evaluation and program justification.

a. Criteria. The following criteria may assist in judging the scope and detail of the interim plan in contrast to the fully developed plan:

(1) The geographic area of the interim plan may be limited to the area affecting or affected by a proposed project or projects, including non-point pollution sources; whereas the more detailed plan must embrace the entire river basin in the case of basin plans.

(2) Information presented in the interim plan may be based more on available data plus judgment factors, such as literature values or approximate analyses where detailed analyses are not available; whereas the more detailed plan must include relevant data from stream surveys, modeling and more detailed evaluations. Where useful data or information are not available, the interim planning response should so state.

(3) The interim plan will focus on information and evaluation to be used in critical decisions affecting regionalization and plant design for the immediate construction grant program; whereas the fully developed plans will place greater emphasis on non-point sources of pollution, growth factors and land use policies and regulations to prevent future pollution and will emphasize coordination with related water and land use planning development policies and conservation.

b. Content. Some of the items which interim plans will consider are as follows:

(1) Descriptive statement as to its relationship to the adopted areawide goals, objectives, and land use elements of the comprehensive planning as adopted by the APO.

(2) Delineation and description of the service areas, the types and locations of existing and planned major waste water collection and disposal facilities.

(3) Clear allocation of responsibilities for carrying out

water quality management basin plans and areawide plans.

(4) Preliminary areawide waste water collection and treatment program which covers a 5-10 year period and is consistent with the areawide sewerage plan as adopted by the APO. The preliminary program describes the major facilities to carry out the sewer element of the areawide comprehensive plan and a schedule of priorities with costs for the needed improvements.

(5) Impact of the proposed waste treatment plan on water quality.

(6) Identification of other pollution sources in the planning area and an account of the physical, institutional and legal measures being taken or required to adequately control existing or potential water quality problems.

(7) Evaluation of relevant alternative regional treatment plan configurations and systems.

(8) Coordination with other Federal, State, and regional water resource planning, land use plans, State program plans, and Enforcement Conference recommendations.

8. COORDINATION. Full participation of affected State and local agencies is of utmost importance if required plans are to be developed and implemented. EPA regional staff are available to meet with State, local and regional agency officials for the purposes of establishing necessary coordination and communication arrangements, answering questions on these guidelines, and assisting in the tasks of identifying basin, metropolitan, and regional boundaries and developing schedules for the required planning. The EPA regional office responsible for administration of the Facilities Construction and Operation (FCO) program (formerly construction grants program) for a given State is responsible for coordination and contact with that State to achieve the participation, information, plan development, and plan certification required by the regulations. Assistance of other concerned regions will be obtained as appropriate. Elements of coordination are:

a. Areas Covering More Than One State. Where basins cover more than one State, procedures must be developed by the States among themselves to coordinate the basin plans with the other State or States. Metropolitan/regional areas, where more than one State is involved, must develop procedures for coordination as part of their designation. Designation of basin and metropolitan/regional areas are to be referred to EPA and HUD for concurrence.

b. Clearinghouse Requirement for Regional Agencies. In accordance with Part I of BOB Circular A-95 a network of metropolitan and regional (non-metropolitan) clearinghouses has been established to carry out project notification and review procedures. The clearinghouses should be utilized to establish early contact between Federal, State and local agencies to coordinate water quality planning activities. Clearinghouses can identify agencies of State and local government having plans, programs, or projects that might influence or be affected by the proposed water quality management planning. This "early warning" procedure will minimize delays in final plan review by such clearinghouses preparatory to certification by the Governor as outlined below in 9 c (i) Processing of Plan.

c. Target Dates.

(1) Facilities Construction grant applications will not be accepted in the absence of a certified plan (see paragraph 9c) for project applications submitted after January 1, 1971. Any application submitted before January 1, 1971, may be approved without a certified plan if processing is completed before April 1, 1971.

(2) The following metropolitan/regional areawide plan certifications are required prior to a grant award in accordance with the following schedule:

(a) Prior to October 1, 1971, area and organizational certifications.

(b) On or after October 1, 1971, area and organizational, comprehensive planning, and water/sewer planning and programming certifications.

(3) Facilities Construction grant awards will not be made in the absence of water quality management plans after July 1, 1973.

(4) Water quality management plans developed under these guidelines will be reviewed by the states at least annually and modifications where required should be submitted to EPA before March 1, of each year.

d. Plan Presubmission. It is advisable that Basin Plans and areawide (metropolitan/regional) water quality management plans be submitted to the EPA and HUD Regional Offices for review purposes prior to transmittal to the Governor for state certification. In addition, meetings should be held between State, local, EPA and HUD representatives to discuss any deficiencies of the plans with respect to the EPA-HUD planning requirements as set forth in these Guidelines and the HUD Areawide Planning Requirements.

e. State/Local Coordination. States should develop formal arrangements with basin and metropolitan/regional agencies setting forth policies and procedures required for the coordination of planning.

9. PROCESSING OF PLAN.

a. Statements to Accompany Plan.

(1) Implementing Authority(ies). The implementing authority(ies), their specific powers and responsibilities for specific parts of the plan, and geographical areas of jurisdiction shall be identified. Detailed information for metropolitan areas included in the plan may be noted by reference. To the extent possible, elected officials of local government or their designated representatives should be involved in both basin and metropolitan/regional planning. Metropolitan/regional plans should be prepared by agencies controlled by policy bodies which are composed, by voting representatives from areawide or local governments who are elected officials or appointed chief executives responsible to elected officials (see HUD areawide planning requirements).

(2) Status of Implementation. A statement shall be included as to actions recommended in the plan which have been accomplished at the time of certification, and of any projected changes in actions that have already been accomplished or are pending, or changes in schedules from those set forth in the plan. This shall include the requirements of approved water quality standards programs and recommendations of Federal-State enforcement conferences.

(3) Evidence of Consideration by Local Government. Work programs and draft material for basin and metropolitan/regional plans shall be distributed to local governments for comment when prepared. In submitting the regional or metropolitan plan to the Governor(s) or his designee, the agency preparing the plan shall include a statement or discussion of the views or the position on the plan by each appropriate unit of local general government and each appropriate special district or authority exercising jurisdiction within the metropolitan or regional area. In the case of interstate, metropolitan or regional areas, this statement shall include the views of the general governments and districts or authorities for each of the States. The above requirement may be met on determination of EPA that the plan has been adopted by a regional or metropolitan agency having formal representation and an expression of views of local governments established under State enabling legislation and designated by the Governor as the A-95 clearinghouse. In this situation, a summary of the views including objections shall be included.

(4) Environmental Assessment. An environmental assessment is to be prepared as part of the plan as required by the National Environmental Policy Act of 1969. The assessment will address itself to the following:

(a) Probable impact of the plan on the environment.

(b) Any probable adverse environmental effects which cannot be avoided.

(c) Alternatives considered with evaluation from environmental standpoint.

(d) Relationship between planned local short-term uses of environment and maintenance and enhancement of long-term productivity.

(e) Any irreversible and irretrievable commitment of resources.

(f) Indication of public objections to plan arising because of environmental issues, if any, and their resolution.

b. Certifying Letter.

(1) State. The plan shall be accompanied by a letter signed by the Governor or his designee stating that the plan is consistent with state programs, that it is either an interim plan or water quality management plan for the designated basin or metropolitan/regional area, that it is consistent, (or the reasons it is inconsistent) with all certified interim or metropolitan/regional plans affecting the basin, and that it is consistent with basin plans for adjoining basins.

(2) Interstate. In the case of interstate, basin and/or metropolitan/regional plans, the plans shall be accompanied by either a separate letter from each Governor (or his designee) or a joint letter signed by each of the Governors (or designees) providing the same certification as above. The letters from the Governors (or their designees) of the concerned States should state that the accompanying plan is an approved pollution abatement plan and that it is consistent with all certified basin and/or metropolitan/regional plans within the basin as well as with basin plans for adjoining basins.

c. Submission of Plans for Acceptance. Figure 1-9.2. illustrates the process of plan submission for acceptance and certification, particularly the interrelationships between the River Basin Planning Commission or State Planning Advisory Committee, APO, EPA, HUD, and other state and local units of government.

(1) Clearinghouses. Plans should be made available prior to certification by the Governor or his designee to the appropriate State, metropolitan or regional clearinghouse operating under BOB Circular A-95.

(2) State Certification. After approval by the Governor(s) or his designee, two copies of the plan and summary together with the required supporting documentation will be forwarded to the Regional Director of the appropriate EPA region.

(3) Federal Certification. The Regional Director, following EPA review and approval, will forward all State certified plans meeting EPA water quality planning requirements (18CFR601) to the appropriate HUD Area Office Director for review and certification of areawide (metropolitan and regional) planning. The HUD Area Office will issue a certification based upon an approval letter from EPA and fulfillment of the HUD Areawide Planning Requirements. All projects identified in these plans will be eligible for the 10% increase provided for in Section 8 (f), of the Federal Water Pollution Control Act, as amended.

(4) Notifications. Within 30 days, the HUD Area Office Director will notify the EPA Regional Director and appropriate APO's of the Federal certification. The Regional Director will notify the Governor(s) or his designee(s) and the River Basin Planning Organization or State Planning Advisory Committee. No basin plan or areawide (metropolitan/regional) plan will be considered acceptable by the Regional Director unless the HUD Area Office has made the areawide (metropolitan/regional) planning certifications.

(5) Exceptions. Where there is need for a treatment facility in response to an Enforcement Conference or to meet compliance of previously approved water quality standards (implementation schedules) these requirements for such projects may be modified after concurrence among HUD, EPA, and the State(s).

(6) Non-Acceptance. Where a plan is not acceptable it will be returned with all items that do not comply with the guidelines noted and suggested arrangements for resolving the differences.

INTERRELATIONSHIPS OF FEDERAL, STATE, AND LOCAL UNITS OF GOVERNMENT IN PLAN SUBMISSION

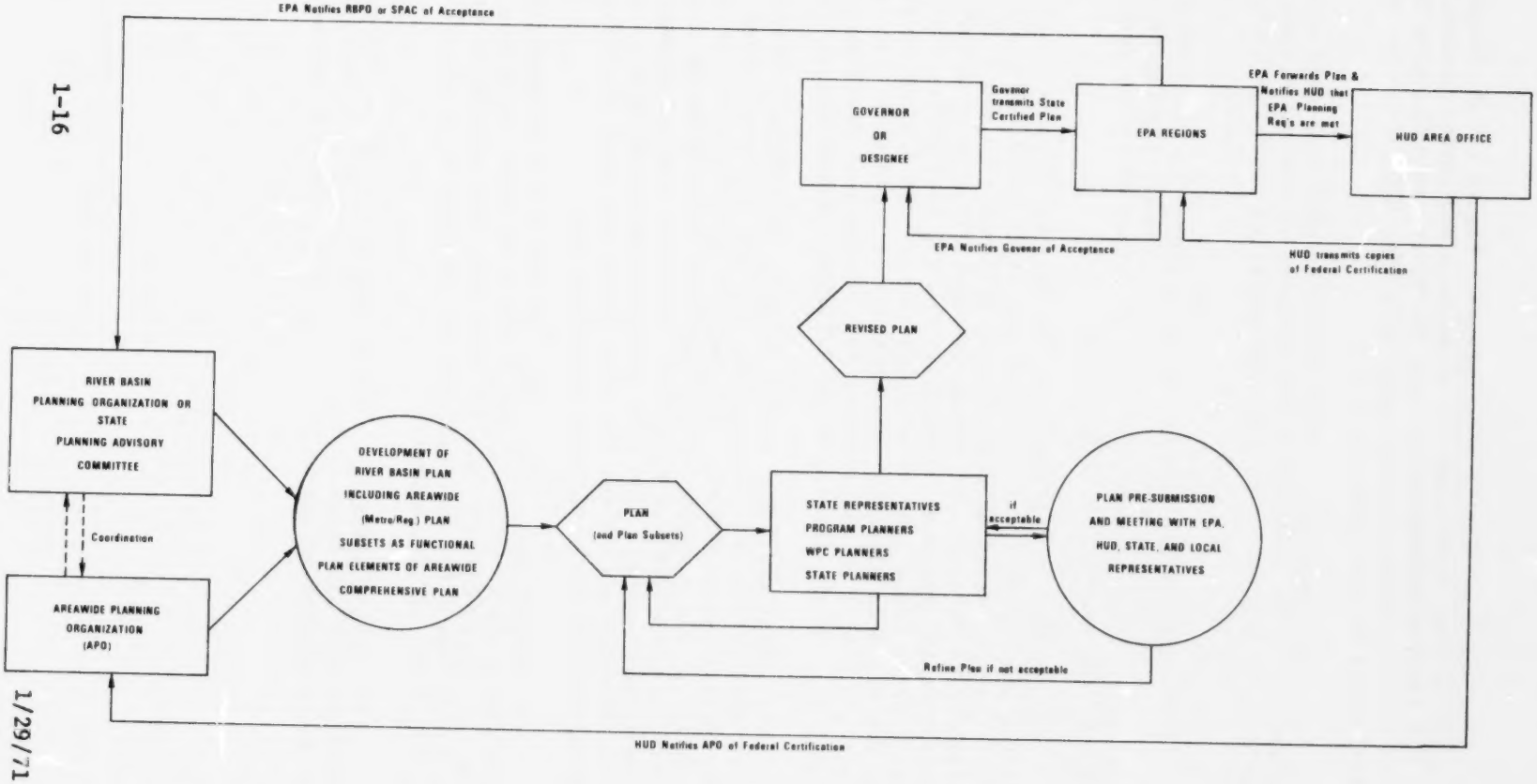
EPA Notifies RBPO or SPAC of Acceptance
GOVERNOR OR DESIGNEE
Governor transmits State Certified Plan
EPA REGIONS
EPA Forwards Plan & Notifies HUD that EPA Planning Req's are met
HUD AREA OFFICE
EPA Notifies Governor of Acceptance
HUD transmits copies of Federal Certification
REVISED PLAN
RIVER BASIN PLANNING ORGANIZATION OR STATE PLANNING ADVISORY COMMITTEE
Coordination
AREAWIDE PLANNING ORGANIZATION (APO)
DEVELOPMENT OF RIVER BASIN PLAN INCLUDING AREAWIDE (Metro/Reg.) PLAN SUBSETS AS FUNCTIONAL PLAN ELEMENTS OF AREAWIDE COMPREHENSIVE PLAN
PLAN (and Plan Subsets)
STATE REPRESENTATIVES PROGRAM PLANNERS WPC PLANNERS STATE PLANNERS
if acceptable
PLAN PRE-SUBMISSION AND MEETING WITH EPA, HUD, STATE, AND LOCAL REPRESENTATIVES
Refine Plan if not acceptable
HUD Notifies APO of Federal Certification

Figure 1-9.2 Plan Submission Process

d. Review and Modification. To keep plans as current as possible, each plan should be reassessed for changing conditions on a continuing basis and modified as necessary but at least annually. Notice of plan modification must be provided A-95 clearinghouses.

e. Lines of Communication.

(1) EPA. Official communication concerning the plans will be directed to the Governor of the State or his designee (the certifying agency).

(2) Local. Further communications originated by the local or regional planning authority should be addressed to the designated certifying state agency or official.

(3) State. State originated communications to EPA should be directed to the Regional Director of the appropriate EPA region. States shall coordinate all communication with local agencies.

f. State Program Plans. Plans prepared by local planning organizations are to provide the basis for the State program plan submitted annually to EPA under Section 7 of PL 660, i.e., the State program plan should describe the State Planning Program and the strategy for accomplishing that program.

GUIDELINE FOR IMPLEMENTATION PLAN

The plan for implementing water quality criteria should be submitted in tabular form, by major river basin area, in sufficient detail to describe the nature of the actions to be taken to achieve compliance and a time schedule for such compliance. Necessary information should be included using the following tabular headings: location, source, type waste, treatment (current and required), receiving stream, interim dates (preliminary plans, financing arranged, final plans and specifications, start construction, complete construction), and remarks. Source should include, by individual name, municipal, industrial, or other polluters (marinas, feedlots, etc.). Interim dates should include month and year. If item has been completed, enter "compl." in appropriate column. Other information, such as volume of waste and water uses, may be included. Water quality criteria and the plan of implementation, once adopted by the State and the Secretary, may be revised only with the approval of both parties under the procedures established in the Federal Water Pollution Control Act, Section 10.

SAMPLE PLAN

Plan illustrated taken from the Massachusetts water quality standards report and illustrates the format and information required for a functionable implementation plan.

CONNECTICUT RIVER

LOCATION	SOURCE	TYPE OF WASTE	VOLUME mgd	RIVER CLASSIFICATION		TREATMENT		DATES						REMARKS
				Present	Proposed	Present	Required	Prel. Report Plans	Approp. of Funds	Acq. of Site	Compl. Final Plans	Start of Constr.	Compl. of Constr.	
WEST SPRINGFIELD	Municipal Proj.#1	Sanitary	3.2	D	C			compl.			12/67	3/68	12/68	To Springfield STP
	Proj.#2	Sanitary		D	C						1/73	3/73	12/74	
	Southworth Co.	Paper		D	C	none		compl.			12/67	3/68	12/68	(7) To Westfield River
	Strathmore Paper Co. Inc.	Paper		D	C	none		compl.			12/67	3/68	12/68	(7) To Westfield River
	Pre-moid Paper	Paper		D	C	none		compl.			12/67	3/68	12/68	(7) To Westfield River
WESTFIELD	Municipal	Sanitary	2.0	D	B	none	secondary		7/67		5/68	7/68	7/70	Westfield River
	Foster Machine Co.	Plating			B	none	pre-treat.	9/67			5/68	7/68	7/70	(8) To Little River
	Stevens Paper Mills Inc.	Paper	1.5		B	save-alls		9/67			5/68	7/68	7/70	To Little River
	Columbia Bicycle	Plating		D	B	none	pre-treat.	9/67			5/68	7/68	7/70	(8) To Little River
	American Abrasive	Inorganic		D	B	none	primary	9/67			5/68	7/68	7/70	To Westfield River
EAST LONG MEADOW	Municipal	Sanitary	1.25	D	B	primary	secondary	1/72	3/72	4/72	1/73	3/73	6/74	(4) To Pecousic River
LONG MEADOW	Municipal	Sanitary	0.82	D	C	primary	secondary	1/72	3/72	4/72	1/73	3/73	6/74	(4)
AGAWAM	Municipal	Sanitary	1.0	D	C	primary	secondary	1/72	3/72	4/72	1/73	3/73	6/74	(4) Treated by Springfield

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Title 18—CONSERVATION OF POWER AND WATER RESOURCES

Chapter V—Federal Water Quality Administration, Department of the Interior

PART 601—GRANTS FOR WATER POLLUTION CONTROL

Subpart B—Grants for Construction of Treatment Works

On March 31, 1970, notice of proposed rule making was published in the FEDERAL REGISTER (35 F.R. 5346) which set forth the text of regulations, proposed to amend Subpart B relating to basin plans, regional or metropolitan plans, industrial waste treatment, design and inspection of waste treatment facilities.

Pursuant to the above notice, a number of comments have been received from interested persons, and due consideration has been given to all relevant matter presented. In light of the preceding, a number of revisions have been made in the rules as proposed.

In accordance with the statement in the notice of proposed rule making, Subpart B of Part 601, as set forth below, is hereby adopted effective on publication.

Subpart B—Grants for Construction of Treatment Works

Sec.

601.32 Basin control.
601.33 Regional and metropolitan plan.
601.34 Industrial waste treatment.
601.35 Inspections.
601.36 Design.

AUTHORITY: The provisions of this Subpart B issued under section 8 of the Federal Water Pollution Control Act, as amended (70 Stat. 502; 33 U.S.C. 466e) and section 22(a) of the Act, as amended (75 Stat. 204; 33 U.S.C. 466).

§ 601.32 Basin control.

(a) No grant shall be made unless the Commissioner determines, based on information the State, or where appropriate, the interstate agency, for the areas within their respective jurisdictions, furnishes to him pursuant to paragraph (b) of this section that a project is included in an effective current basin-wide plan for pollution abatement consistent with applicable water quality standards.

(b) In reaching such determination, the Commissioner may require information in such manner as he prescribes concerning the total basin plan, or portion thereof, as he deems adequate to evaluate the effectiveness of the project. Such information shall be furnished within one year of the date of the Commission's request for such information. The Commissioner may extend this period for proper cause. For this purpose, the affected river basin waters shall be deemed not to include any waters outside the State in which the project is located but shall include waters in another State if an interstate agency has jurisdiction of the additional affected basin waters. The Commissioner shall consider whether the plan adequately takes into account all, or such as may be appropriate, of the following:

(1) *Sources of pollution.* An identification list of all significant point sources of waste discharges; municipal, industrial, agricultural and others.

(2) *Volume of discharge.* The average daily volume of discharge produced by each waste discharger. Cooling water, or cooling water which is contaminated by industrial waste or sewage shall be reported separately. Storm water and mixed storm water and sewage shall be identified and reported separately in terms of frequency-volume relationships.

(3) *Character of effluent.* The major characteristics of each such waste discharge together with a measurement of their relative strength or concentrations, including but not limited to:

BOD 5	mg/l.
COD	mg/l.
Color	Platinum cobalt scale.
Turbidity	Jackson candle scale.
Solids	mg/l.
Toxic substances	
Metal Ions	mg/l.
Fluorides	mg/l.
Dissolved substances	ppm.
Temperature	C.
pH	
Radioactivity	pCi/l.
Chlorides	mg/l.
Nutrients	mg/l.

(4) *Present treatment.* A brief description of the type of treatment being given by each discharger, together with a statement of the degree of treatment currently being achieved.

(5) *Water quality effect.* A brief description of the effect of discharges and abatement practices upon the quality of the water in the basin, and the anticipated effectiveness of the proposed project in improving the quality of the water.

(6) *Detailed abatement program.* Identify all waste discharges for which present treatment is less than required by standards, or which will degrade water quality below standards. For each such discharge so identified, furnish an abatement schedule containing the following:

(i) Level of treatment to be required expressed in percentage of reduction of BOD and/or any other significant parameters required pursuant to applicable Federal, State and interstate laws, regulations and orders.

(ii) Volume of flow for which waste treatment facilities will be designed.

(iii) Estimated completion dates for preliminary plans, for final design, for construction, and for operation of waste treatment facilities.

(iv) Estimated cost of design and construction if available.

(c) If the proposed project is not included in an effective basin-wide plan for pollution abatement, and the Commissioner determines that such project will nevertheless effectively contribute to the improvement of the quality of the water or prevention of water pollution in the basin, he may waive the limitation of paragraph (a) of this section. In making his determination the Commissioner may require all or a part of the information identified in paragraph (b) of this section.

(d) The Commissioner's discretion in determining the desirability of any project shall not be limited by any provision of any basin-wide abatement plan pursuant to this section.

§ 601.33 Regional and metropolitan plan.

(a) A grant for a project shall not be made unless the Commissioner determines that such project is included in an effective metropolitan or regional plan developed or in the process of development, and certified by the Governor or his designee as being the official pollution

abatement plan developed or in the process of development for the metropolitan area or region within which the project is proposed to be constructed. In the case of an interstate metropolitan or regional area, the plan shall be certified by the respective Governors or their designees.

(b) In reaching such determination the Commissioner shall consider whether such plan adequately takes into account: Anticipated growth of population and economic activity with reference to time and location; present and future use and value of the waters within the planning area for water supplies, propagation of fish and wildlife, recreational purposes, agricultural, industrial and other legitimate uses; adequacy of the waste collection systems in the planning area with reference to operation, maintenance and expansion of such systems; combination or integration of waste treatment facilities into a waste treatment system so as to achieve efficiency and economy of such treatment; practicality and feasibility of treating domestic and industrial waste in a combined waste treatment facility or integrated waste treatment system; need for and capacity to deal with waste from sewers which carry storm water or both storm water and sewage or other wastes; waste discharges presently in, or anticipated for the planning area; effect of the proposed waste treatment facility upon the quality of the water within the planning area with reference to other waste discharges and to applicable water quality standards.

(c) If the proposed project is not included in an effective metropolitan or regional plan for pollution abatement, and the Commissioner determines that such project will nevertheless effectively contribute to the prevention of pollution or improvement of the quality of the water in the metropolitan area or region, he may waive the limitation of paragraph (a) of this section. In making his determination the Commissioner may require all or a part of the information identified in paragraph (b) of this section.

(d) The Commissioner's discretion in determining the desirability of any project shall not be limited by any provision of any metropolitan or regional plan pursuant to this section.

§ 601.34 Industrial waste treatment.

(a) Where a project will treat industrial wastes, a grant may be made in the discretion of the Commissioner for such project provided that it is included in a waste treatment system treating the wastes of the entire community, metropolitan area or region concerned. For the purposes of the section "waste treatment system" means one or more treatment works which provide integrated, but not necessarily interconnected, waste disposal for a community, metropolitan area or region.

(b) If industrial waste is to be included in the waste treated by the proposed project, the applicant shall assure the Commissioner that such applicant will require pretreatment of any industrial waste which would otherwise be detrimental to the treatment works or its proper and efficient operation and maintenance, or will otherwise prevent the entry of such waste into the treatment plant.

(c) Where industrial wastes are to be treated by the proposed project the applicant shall assure the Commissioner that it has, or will have in effect when the project will be operated, an equitable system of cost recovery. Such system of cost recovery may include user charges, connection fees or such other techniques as may be available under State and local law. Such system shall provide for an equitable assessment of costs whereby such assessments upon dischargers of industrial wastes correspond to the cost of the waste treatment, taking into account the volume and strength of the industrial, domestic, commercial wastes and all other waste discharges treated, and techniques of treatment required. Such cost recovery system shall produce revenues, in proportion to the percentage of industrial wastes, proportionately, relative to the total waste load to be treated by the project, for the operation and maintenance of the treatment works, for the amortization of the applicant's indebtedness for the cost of such treatment works, and for such additional costs as may be necessary to assure adequate waste treatment on a continuing basis. For purposes of this section "industrial waste" shall mean the waste discharges (other than domestic sewage) of industries identified in the Standard Industrial Classification Manual, Bureau of the Budget, 1967, as amended and supplemented, under the category "Division D—Manufacturing," and such other wastes as the Commissioner deems appropriate for purposes of this section.

§ 601.35 Inspections.

No grant shall be made for any project unless the State water pollution control agency assures the Commissioner that the State will inspect the treatment works not less frequently than annually for the 3 years after such treatment works are constructed and periodically thereafter to determine whether such treatment works are operated and maintained in an efficient, economic and effective manner and unless the applicant assures the Commissioner that the treatment works will be maintained and operated in accordance with such requirements as the Commissioner may publish from time to time concerning methods, techniques and practices for economic, efficient and effective operation and maintenance of treatment works.

§ 601.36 Design.

No grant shall be made for any project unless the Commissioner determines that the proposed treatment works are designed so as to achieve economy, efficiency and effectiveness in the prevention or abatement of pollution or enhancement of the quality of the water into which such treatment works will discharge and meet such requirements as the Commissioner may publish from time to time concerning treatment works design so as to achieve efficiency, economy and effectiveness in waste treatment.

Dated: June 24, 1970.

FRED J. RUSSELL,
Acting Secretary of the Interior.

[F.R. Doc. 70-8396; Filed, July 1, 1970; 8:46 a.m.]

PROCEDURE TO AMEND OR MODIFY FEDERALLY APPROVED WATER QUALITY STANDARDS

1. Water quality standards which have been approved by the Secretary of the Interior or the Environmental Protection Agency Administrator become Federal standards.

2. Approved water quality standards can only be revised pursuant to Section 10(c)(2) of the Federal Water Pollution Control Act, which can be set in motion only by specific action by the Environmental Protection Agency Administrator or a Governor of an affected State. 1/ The Environmental Protection Agency Administrator must call a conference and thereafter prepare regulations setting forth applicable standards. If the State has not adopted water quality standards found by the Administrator to be consistent with his proposals or a petition for public hearing has not been filed by a Governor, the Administrator is to promulgate such standards. If such a hearing is requested under Section 10(c)(4), the Administrator is required after public hearings held by a duly constituted board to issue standards in accordance with the board's recommendations.

A State may not unilaterally change standards. The only way a State may effectuate a change is to ask the Administrator for a revision. The Administrator may not change standards without having a standards setting conference and if the Governor of an affected State so requests a subsequent hearing.

1/ The phrase "the Governor of any State affected" covers water quality standards revisions desired by the Governor of the State which originally adopted the standards or of any other affected State. The paragraph therefore applies to all water quality standards revisions and establishes a single, uniform revision procedure, since the Federal statute, by prescribing a specific procedure, presumably preempts State power to employ a different one.

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Appendix 2-A Methodology

CHAPTER 2. BASIN PLANS

1. PURPOSE. This chapter defines the general information that should be addressed in the development of a water quality management plan for a basin. The purpose of a basin plan is to define a basin-wide water quality management program and an implementation strategy which has a high probability of success. The basin plan should provide an overview of the total water and related land resources of the basin and should assess those factors which, for any reason, cannot be effectively evaluated separately by the various metropolitan/region (M/R) areas within the basin. The water quality management strategy of the basin plan would thus normally include: the definition of the design hydrology; the allocation of the available waste carrying capacity of the receiving water (consistent with water quality criteria and/or non-degradation policies) to the various regional, metropolitan, individual, and non-point waste sources; the allocation of the available storage for flow regulation; and an assessment of the feasibility of importing or exporting waste waters. These allocations define external constraints which are required for the M/R plans within the basin. The basin plan should also identify the need for more detailed plans for all existing and potential M/R plans within the basin. Additionally the plan should set a timetable for planning for each of the identified M/R areas. The timetable should be based on each M/R area's relative contribution to the basin's water quality problems. The following paragraphs provide guidelines for achieving a water quality management plan for a basin and set forth the essential elements of such a plan. Detailed information included in certified regional or metropolitan plans within the basin may be referenced in lieu of repetition.

2. METHODOLOGY. In some basins with widely separated waste discharges and favorable hydrologic circumstances water quality problems may be relatively simple. In others there may be strong interdependence between waste sources with resulting complex water quality problems. A framework is provided in Appendix 2-A to assist in plan formulation. It can accommodate either simple or complex cases.

3. WATER QUALITY MANGEMENT PLAN. The plan should define the relative contribution to the water quality problems in the basin by each of the various regional and metropolitan areas, other dispersed point waste sources, and by natural and other non-point sources. The fully developed basin plan allocates the waste carrying capacity of the receiving water, as defined by water quality criteria and/or non-degradation policies, to these sources and outlines a cost-effective strategy for achieving and maintaining the desired water quality goals. The essential elements

of the plan, including the basic premises on which the plan is formulated, should be set forth in a concise manner. These elements include:

a. Statement of plan objectives. The basic objective of the water quality management plan is to provide the most cost effective abatement strategy, considering social and environmental factors, for protecting existing and projected water uses and to prevent degradation of existing high quality waters. Water quality criteria have been set on interstate waters to reflect the level of quality necessary to protect existing and future uses. These criteria provide explicit statements which may be used as the basis for allocating the waste carrying capacity of the receiving water. If the criteria do not exist water quality levels or goals which protect the identified water uses must be specified for the analysis. For existing high quality waters where non-degradation policies provide for maintenance of quality levels above those reflected in the water quality criteria, the existing quality levels become the basis for the allocation. The most cost effective water quality management strategy in a basin, considering social and environmental costs, should result in the greatest improvement in water quality for each dollar spent. Generally this cost effective strategy will also result in the least cost solution of meeting the specified water quality objectives under the stipulated constraints. The least cost analysis provides the base for specifying the scheduling of funds and facility construction which results in achievement of water quality management objectives at the lowest dollar cost consistent with a high calculated probability of success and a low probability of economic loss.

b. Statement of Problem. A description assessing the water and related land resources of the basin should be provided. The description should include a discussion, as delineated below, of the relation of these resources to the demography and economy of the basin and the impact on water quality:

(1) Physical System. Maps and a discussion of the geographic extent including:

(a) A classification of the receiving waters into streams, impoundments, lakes, estuaries, and coastal waters.

(b) A delineation of physical factors such as: the geometric configurations (surface areas, depths, etc); present and

probable future hydrology of the basin (including an analysis to establish low flow frequencies and durations); and hydrodynamic characteristics (e.g. velocities, travel times, tidal and mixing characteristics, etc.).

(c) The boundaries of areawide planning jurisdictions.

(2) Social and Economic Analyses. Land use, population, industrial and agricultural development should be analyzed as they may affect the water resource. For the basin plan this analysis should indicate trends for the basin as a whole and trends between M/R areas but should not be concerned with detailed patterns within an M/R area. However, data developed as part of any M/R plan should be utilized in the basin plan, if available, to define the gross figures for that M/R area.

(3) Waste Water Sources. Give location (by river mile), identification and quantification of waste load inputs, including municipal, industrial, agricultural, urban runoff, and natural sources and the probable future changes in their magnitude, nature and location.

(4) Water Quality. A discussion of water uses, water quality levels, and quality criteria. Existing water and related land uses should be delineated and related to the economy of the basin. Included in the water uses should be an assessment of the general aesthetic importance of the waters. The impact on water quality of increased utilization of the water and related land resource should be assessed in light of the economic analysis. The various chemical, biological, and physical quality parameters affecting any water use should be identified. Existing water quality levels for all parameters should be assessed in terms of their impact on the water uses and on the general aesthetic value of the water and adjacent lands. This assessment should include the definition of water quality levels required to protect or enhance the utilization of the waters. If water quality criteria do not exist these required levels should be included as criteria which can be utilized in the analysis. For waters with existing water quality criteria either the required levels delineated above, or the water quality criteria should be utilized, whichever reflects the highest quality. This analysis thus also provides a basis for upgrading existing water quality criteria where existing water quality is higher than the stipulated water quality criteria.

c. Planning Premises. Those premises upon which the plan is based must be clearly defined. For example, an overriding premise is that water quality criteria or other water quality goals (including non-degradation) on interstate and intrastate waters will be met. This

premise is generally discussed in the previous section. Examples of what might be covered in this section are:

(1) Treatment. Existing Federal and State policies dictate minimum treatment levels for wastewaters that do not necessarily relate to the physical requirements of meeting the water quality criteria. Technological limitations may also define upper limits for removal efficiencies of many water quality parameters. Such treatment constraints can be incorporated into the analysis to assure compliance with exisitng policies and to safeguard against unattainable solutions.

(2) Political, Jurisdictional, and Administrative. Some technically feasible alternatives may in certain cases, be constrained because of the absence of a legislative base for implementation. Additionally jurisdictional problems can exist because of the vested interests of the many institutional entities which may exist in a basin. Where conflicts of interest exist they must be examined and reported. And if such conflicts affect any of the abatement alternatives, they must not only be recognized as constraints in the analysis, but organizational or other institutional remedies should be proposed.

(3) Resource Availability.

(a) Funding. The plan must specify the necessary resource levels for each time period to accomplish the objective within the desired timeframe. The actual funding level for any time period may, however, preclude implementation of the most cost effective construction schedule. Even with such a constraint the analysis procedure can be utilized to ascertain which facilities should be constructed for given sets of funding levels. Thus the funding level at each time step dictates the implementation schedule.

(b) Storage. In cases where flow regulation is considered as an abatement or pollution prevention tactic the upper limit of available storage must be considered -- including such factors as availability of reservoir sites, existing allocation of storage to other purposes, and the congruence of demands upon the stored water supply.

d. Alternatives. There are normally several possible alternatives for meeting the water quality objectives for a basin.

(1) These include:

(a) Treatment of the wastewater.

(b) Relocation of discharge points.

(c) Diversion from basin.

(d) Flow regulation.

(e) In-stream modification.

(f) Water reuse.

(g) Control of wastewater quantities through zoning and/or planned growth both for type and amount of expansion.

(h) Combinations of the above.

(2) In any given basin some of the above alternatives may not be technically feasible or may be considered to be politically unacceptable. However, political acceptability is a function of understanding and it is the planner's task to lay alternatives before the public in a manner that facilitates understanding. Of the waste sources identified previously some may not be amenable to direct control methods. Agricultural and natural wastes often occur as non-point sources making regulation difficult. However, this should not preclude the development of a water quality management plan. The plan should treat these waste sources in the light of their relative contribution to the water quality problem in the basin. Where water quality criteria cannot be maintained or met without the abatement of such sources the plan must specify abatement procedures that have a high probability of success relative to risk.

(3) Analysis techniques can be utilized to determine if each control method can, by itself, result in standards compliance. These techniques also allow evaluation of specific combinations of the control methods; however, because of the large number of possible combinations of the methods such a "cut and try" procedure may be impractical. Additionally, except for relatively simple and straightforward cases there is little assurance that the combinations considered would result in anything close to an efficient solution. Each of the control methods will, over the full range of its effectiveness, have an associated cost function which relates the unit costs of improving the water quality. These cost functions should include all quantifiable costs including design, construction, operation, maintenance, replacement, and loss of benefits to other water uses. Since alternatives will

normally have different expenditure schedules the cost should be expressed in terms of present worth and must be appropriately discounted. In addition to the required cost functions, any factors which may limit the applicability of each alternative must be identified. The cost functions along with any constraints can be utilized to conduct a logical analysis to determine the combination of abatement methods which offer efficient solutions. For such analysis, regional and metropolitan waste sources may be lumped into single point sources. As pointed out above the basin plan provides an overview to ascertain the allocation of the waste carrying capacity of the receiving water to the various regional and metropolitan areas and to other sources. Detailed locations of waste sources within metropolitan and regional areas should, in most cases, not be of concern in the basin plan. Alternatives should be examined with respect to their potential to upgrade urban areas, establish parks or other programs and to increase public use and enjoyment of environmental resources as well as their effect on water quality alone. Compatibility with plans of other Federal agencies and regional land use plans, State Program Plans, and Enforcement Conference recommendations must be assessed as should the relevance of such factors to goal attainment. To assure that actions taken to achieve water quality control have a minimum adverse effect on the environment, the environmental impact of each alternative must be assessed. When adverse effects on land or air resources cannot be avoided, they should be included in the analysis in such manner that the abatement strategy will minimize them.

e. Water Quality Management Strategy. The alternative selected that provides the most cost effective strategy for achieving the plan objectives, considering the social and environmental factors, will be explained in this section with emphasis on:

(1) Allowable waste loads from each "regionally combined" and "other" point sources.

(2) Requirements for non-point sources.

(3) All water quality control measures which are elements of the abatement strategy.

(a) Sewerage facilities.

(b) Flow regulation.

(c) Diversion from basin.

(d) In-stream modification.

(e) Water reuses.

(f) Control of wastewater quantities through zoning and/or planned growth.

(g) Relocation of discharge points.

(4) Assigned priorities between the various waste sources considered.

(5) Communities or areas which would benefit from a regional plan.

(6) Funding levels required for each time period for the most cost effective implementation of the plan.

(7) Manpower requirements, availability, and need for training programs.

(8) Existing institutional entities and their responsibilities defined by the governing regulations, laws, and ordinances.

(9) Responsibilities for implementation of the plan including financing, construction, facility operation, evaluation of effectiveness of abatement methods, etc.

(10) Legislative and/or institutional changes which would aid in implementation of the plan.

(11) The environmental impact.

(12) The relationship of the plan to plans of other resource agencies.

4. UPDATING PROCEDURES. Recognizing that effective water quality management for a basin requires continual evaluation to consider changing waste loads, water uses, hydrographic conditions, technological

advances, standards of living, public demands, legislative authority, institutional arrangements, national and regional fiscal priorities, etc., it is imperative that the methodology for developing the plan be flexible to accommodate revisions in the operation of the plan. The methodology presented heretofore provides guidelines which can be used to prepare a water quality management plan for a basin and which can be used for updating and revising the plans. For example a change in legislative authority or in existing institutional arrangements in a basin could result in additional feasible alternatives. The strategy would then be revised to be consistent with the updated set of alternatives. Paramount in the updating procedure, is an assessment of the effectiveness of the strategy previously undertaken. A water quality monitoring program should be established to satisfy this need. In addition, such a program would also define weaknesses in the premises on which the strategy is based. The water quality monitoring program needs to be coordinated with other environmental monitoring efforts.

APPENDIX 2-A

METHODOLOGY

1. Introduction. There was no specific differentiation, in chapter 2, between the mathematical analysis procedures required to predict the quality levels in the receiving waters resulting from waste discharges and those procedures required to ascertain the cost-effective or least-cost management strategy. The two are, necessarily, related; however they may be accomplished as separate steps utilizing different mathematical procedures as discussed in the following paragraph.

2. Analysis Techniques. Mathematical analysis procedures to predict receiving water quality are generally utilized to define the allowable waste loads to a receiving water. These predictive models form the basis for the follow-up cost and/or optimization analysis required to define the least cost combination of alternatives to meet the plan objectives.

a. Water Quality Prediction. The classification of the receiving waters and the problem identification outlined in chapter 2 provides the basic input to the necessary calculations that are required for the analysis. For simple cases such as single point sources the determination of the impact on the receiving water can be a straightforward calculation. In many cases, however, there are several waste discharges with interrelated effects on the receiving water which will require more demanding analysis techniques such as utilization of computerized mathematical models. In either case the following procedures can be utilized.

(1) Identification of appropriate temporal and spatial scale. Depending on the water quality parameters being considered, there are appropriate time and spatial scales which should be utilized in the analysis.

(a) Temporal scale. In some basins water quality criteria may dictate an analysis on a relatively small time scale. For example if the standard for a parameter such as dissolved oxygen (DO) specifies both concentration and duration (e.g. the DO shall not be below 5.0 mg/l for more than four hours a day during certain months) it may be necessary to predict the diurnal variation of DO. For other parameters weekly, monthly, or seasonal variations may suffice and in still others only the annual or long-term variations may be required.

(b) Spatial scale. The spatial scale utilized in the analysis should be consistent with the time scale utilized but may also

be governed by the geometry of the system (location of tributaries, etc). Analysis of localized problems near a waste outfall may require a detailed representation of the receiving water. The spatial scales should reflect the characteristic lengths over which concentrations are assumed to be uniform. For example, in a river it is usually valid to assume vertical and lateral variations in concentration are small by comparison to the longitudinal variation. The longitudinal scale may be dictated by the location of waste sources, reach lengths specified by water quality standards, hydraulic and mixing characteristics, etc.

(2) Data Evaluation and Screening. Regardless of the complexity, a mathematical water quality model or analysis technique usually has little a priori validity. It is therefore necessary to verify the model against prototype data. Hence, data evaluation and screening must be accomplished for the relevant input variables as well as the water quality variables of interest to set the averaging intervals over which data are processed and also the significant trends in the data which the mathematical model can be expected to reproduce. Existing data should be gathered from all available sources and its usefulness assessed in terms of the time and space scales required for the mathematical model. If significant data gaps exist it may be necessary to collect additional water quality data or to conduct field investigations (e.g. tracer studies) to provide the necessary data for verification. A statistical analysis of the observed data may be required to ascertain short term variations (tidal or diurnal periodicity), long term trends, or degree of randomness.

(3) Kinetic Specifications. The interrelations of the variables implicated in the problem identified must be specified in order to continue the model construction. Variables can be grouped into the following classifications:

(a) Conservation-non-interacting (e.g. salinity, total dissolved solids, total phosphorus, total nitrogen).

(b) Non-conservative - first order kinetics (e.g. BOD, coliforms).

(c) Sequentially reacting variables - first or higher order kinetics (e.g. BOD-DO, nutrient cycles, etc.).

(4) Interactive coefficient identification. The model coefficients which represent the particular characteristics of the body of water being considered are evaluated based on a set of observed concentrations. The interplay of the calculated model output and the available data produces

a best set of the unknown coefficients which describe the various physical and chemical processes about which little is known a priori. In addition to the water quality variables of interest, it is often prudent to investigate concentration patterns of other variables for which adequate data is available as an additional verification of the model. Thus, for example, in estuaries the salinity distribution is usually considered even if no water quality significance is attached to the salinity distribution.

(5) Verification of model veracity. A major portion of the effort in constructing a mathematical model of the water quality of a body of water is devoted to the verification of the model. Although a difficult and time-consuming task, it is the only way to establish the necessary validity and to render the model useful for planning purposes. The procedure usually followed is:

(a) Examine model output using the coefficients established and compare to a different set of data, (e.g. higher flow, lower temperature, different load).

(b) Check a goodness of fit of the observed data to computed values.

(c) Reevaluate any changes in coefficients and repeat procedure.

(d) The result is a model that should reasonably reproduce observed data.

(6) Sensitivity to system parameter variation. During the verification procedure, it is usually the case that certain parameters of the model have a more drastic effect on the model predictions than other parameters. A sensitivity analysis can be conducted by varying the model coefficients in a systematic way to determine the effect on the predictions. The system response may be linear to some parameters (e.g. waste loads) but non linear to others (e.g. the interaction rates).

b. Optimization Analysis. A general discussion of the requirements for determining a cost-effective strategy for water quality management was provided in chapter 2. For certain cases, tradeoffs between alternatives may be obvious without formal mathematical analysis. For many cases, however, efficient combinations of water quality management tactics cannot be assured without more demanding mathematical analysis procedures. These routines are generally structured to logically compare each of the

alternatives, in terms of its cost and its effectiveness, and to choose those alternatives or combinations of alternatives which meet the specific water quality objectives at the least cost, without violating any of the identified constraints.

3. Available Models. Reports are available which describe various existing mathematical models. Except as noted copies are available at the Clearinghouse for Federal Scientific and Technical Information, Department of Commerce, Springfield, Virginia, 22151. Paper copies are $3.00 each and microfiche copies are $0.95 each. Available reports include:

a. Pisano, W.C., "River Basin Simulation Program," Federal Water Quality Administration, August, 1968, Clearinghouse No. AD 673564,

b. Feigner, K.D. and H.S. Harris, "Documentation Report - FWQA Dynamic Estuary Model," Federal Water Quality Administration, July 1970.

c. Goodman, A.S., and R.J. Tucker, "Use of Mathematical Models in Water Quality Control Studies," Federal Water Quality Administration, 16090---07/69, ORD-6, July, 1969, Clearinghouse No. PB 189293.

d. Pyatt, E.E., et al., "A Model for Quantifying Flow Augmentation Benefits," Federal Water Quality Administration, 16090DRM09/69, September 1969, Clearinghouse No. PB 188208.

e. Kerri, K.D. "Complementary-Competitive Aspects of Water Storage," 16090DEA12/69, December, 1969, Clearinghouse No. 190197.

f. Graves, G.W., A.B. Whinston, and G.B. Hatfield, "Mathematical Programming for Regional Water Quality Management," Federal Water Quality Administration, 16110 FPX08/70, August, 1970, U.S. Government Printing Office, Washington, D.C., Price $1.25.

g. Dickson, N.P., D.W. Hendricks, A.L. Huber, and J.M. Bagley, "Development of a Hydro-Quality Simulation Model," Federal Water Quality Administration, 16090 DWR06/70, June, 1970, Clearinghouse No. 194065.

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Appendix 3-A Regionalization

CHAPTER 3. METROPOLITAN/REGIONAL PLANS

1. PURPOSE. The metropolitan regional plan defines the strategy which results in the most cost effective solution for the waste water disposal problems within the planning area. The basin plan, as discussed in Chapter 2, should define the allowable total waste discharge to the receiving water from each Metropolitan/Regional (M/R) area. Therefore within each M/R area the objective is to allocate this allowable discharge among the individual waste sources. Whereas the basin plan may lump the total waste discharge from the M/R area into a single point discharge, the M/R plan must consider each waste discharge individually. The task becomes one of coordinating these individual waste sources into a regional system. This does not necessarily imply a single treatment facility for the M/R area; rather it implies a coordinated and unified planning effort within a M/R area to assure the most cost effective water quality management program for the area as a whole consistent with the overall strategy for the basin, as defined in the basin plan (see Appendix 3-A for further discussion).

2. METHODOLOGY. In a M/R area the analysis must be concerned with sizing and locating components such as interceptors, trunk sewers, treatment facilities, and outfalls. Generally the analysis cannot be limited to tradeoffs between pollution control methods as was the case in the basin plan. The actual number of components considered will vary greatly from one M/R area to another; therefore the analysis procedures must accommodate either simple or complex cases. A framework for the analysis is presented in Appendix 2-A.

3. WATER QUALITY MANAGEMENT PLAN. This plan should define the most cost effective configuration of components which will be necessary to limit the total waste contribution from the M/R area to that designated in the basin plan. The essential elements of the plan, including the basic premises on which the plan is based, should be set forth in a concise manner. These elements include:

a. Statement of Plan Objectives. In addition to achieving water use goals as explained in Chapter 2, the M/R plan should determine the configuration and mix of components necessary to limit the waste contribution to those quantities stipulated in the basin plan. The M/R plan must also include the scheduling of these components, giving weight to present value of discounted future expenditures. The plan should indicate the relationship of the objectives to the areawide

goals, objectives and land use elements of the area-wide comprehensive planning as adopted by the APO.

b. Statement of the Problem. Similarly to the basin plan the following items should be covered:

(1) Physical System. The classification and discussion of the physical factors is given in Chapter 2, paragraph 3.b.(1);in addition the M/R plan should delineate the:

(a) Metropolitan/Regional area showing present and anticipated boundaries including service areas for each 5-year period within the long term time frame.

(b) Present and proposed land use and zoning.

(c) Principal collection and transmission systems for:

1. sanitary wastes

2. combined sewers

3. storm sewers

(d) Major treatment works and discharge points.

(2) Social and Economic Analysis. In the basin the projections of land use, population, industrial, and agricultural development will only indicate gross trends and generally will not include detailed projects within M/R areas. For a M/R plan growth patterns within the area must be determined from a social and economic analysis of existing metropolitan development. From this base, the possibilities for future expansion and the need for new treatment sites can be estimated. The emphasis should be for 5 year intervals with long term projections being for 20 years or more. These analyses should consider:

(a) Land use, markets, and resource base. The current land use should be considered in the context of the limitations or opportunities it may place on growth.

(b) Population The working force in an area is a reservoir whose characteristics will help determine the future expansion of both industrial and service sectors.

(3) Identification and Quantification of Present and Probable Future Waste Inputs. The economic analyses developed in the preceding sub-paragraph provide estimates of population, industrial, and agricultural growth. These serve as a base for estimating the locations, quantities, and characteristics of future waste flows and should also indicate changing urban runoff problems.

(4) Water Uses and Quality Criteria. The factors which must be studied are the same for both Basin and M/R plans. These factors are outlined in Chapter 2, paragraph 3.b.(4). The M/R plan should address only those waters within the basin affected by the M/R area, i.e., those within and downstream from the area.

c. Planning Premises. The analysis should not be conducted without consideration of the various factors which may limit implementation of any of the alternatives.

(1) Waste Quantity. The overriding constraint in the analysis is that waste quantity limitations set by the Basin Plan will not be exceeded. This constraint can be expressed in functional form which defines the contribution of each component to the allowable waste quantities.

(2) Treatment. Existing Federal and State policies dictate a minimum treatment level for wastewater which does not necessarily relate to the physical requirements of meeting water quality criteria. Technological limitations may also define upper limits for removal efficiencies of many water quality parameters. Such treatment constraints can be incorporated into the analysis to assure compliance with existing policies and to safeguard against unattainable solutions.

(3) Political, Jurisdictional, and Administrative. Some technically feasible alternatives may in certain cases, be constrained because of the absence of a legislative base for implementation. Additionally jurisdictional problems can exist because of the vested interests of many institutional entities which may exist in a basin or M/R area. Where conflicts of interest affect any of the abatement alternatives, they must not only be recognized as constraints in the analysis, but organizational or other institutional remedies should be proposed.

(4) Resource Availability. Without knowledge of resource availability for each timeframe the analysis technique can only determine the most cost effective sequencing of construction. The plan must

therefore specify the necessary resource levels for each time period to accomplish the objective within the desired timeframe. The actual funding level for any time period may, however, preclude implementation of the most cost effective construction schedule. Even with such a constraint the analysis procedure can be utilized to ascertain which facilities should be constructed for any given funding level. Thus the funding level at each time step may dictate the implementation schedule.

d. Alternatives. Certain of the alternative abatement methods enumerated in Chapter 2, paragraph 3.d, are not alternatives for the M/R plan. The streamflow which will be maintained within the M/R area has been determined in the basin plan. Similarly if diversion from the basin is indicated it was stipulated in the basin plan. These two factors would thus become fixed for the M/R analysis. The remaining alternatives listed in Chapter 2 are still viable. Additionally for the M/R area the analysis must consider tradeoffs between combining treatment facilities, transmission facilities, and final disposal methods. As in the basin plan each alternative must have an associated cost function. In this case the function relates the unit costs of waste removal. These cost functions should include all quantifiable costs including design, construction, operation, maintenance, replacement, transmission, and final disposition of the effluent. Since these alternatives will have different expenditure schedules the cost should be expressed in terms of present worth using an appropriate discount rate. This also allows the direct comparison of the alternatives. In addition to the required cost functions any factors which may limit the applicability of each alternative must be identified. The cost functions along with the constraints can be utilized to conduct a logical analysis to determine the configuration of components which will result in the most cost effective solution for the M/R area. Alternatives should be examined with respect to their potential to upgrade urban areas, establish parks or other programs and to increase public use and enjoyment of environmental resources as well as their effect on water quality alone. Compatibility with plans of other Federal agencies and Land Use Plans, State Program Plans, and Enforcement Conference recommendations should be assessed as should the relevance of such factors to goal attainment. To assure that actions taken to achieve water quality control have a minimum adverse effect on the environment, the environmental impact of each alternative must be assessed. When adverse effects on land or air resources cannot be avoided they should be included in the analysis in such a manner that the abatement strategy will minimize them.

e. Water Quality Management Strategy. The pollution control plan selected for the M/R area from the alternatives above should here be explained with emphasis on:

(1) Water quality control measures which are elements of the strategy.

(a) treatment

(b) in-stream modification

(c) water reuse and manufacturing process changes

(d) control of wastewater quantities through zoning and/or planned growth

(e) relocation of discharge points

(2) Assigned priorities between the various waste sources considered.

(3) Funding levels required for each time period for the most cost effective implementation of the plan.

(4) Manpower requirements, availability, and need for training programs.

(5) Existing institutional entities and their responsibilities as defined by the governing regulations, laws, and ordinances.

(6) Responsibilities for implementation of the plan including, capital improvement programming, financing, construction, facility operation, evaluation of effectiveness of abatement methods, etc.

(7) Legislative and/or jurisdictional changes which would aid in implementation of the plan.

(8) The environmental impact statement.

(9) The relationship of the plan to plans of other resources agencies.

4. UPDATING PROCEDURES.

a. M/R Plan. A discussion of updating basin plans is included in Chapter 2, paragraph 4. The same discussion applies for both M/R and basin plans.

b. Basin Plan. The development of the M/R plan might result in inconsistencies between it and the basin plan. For example updating

of the basin plan would be indicated if the M/R plan identified either of the two following situations:

(1) The M/R plan indicates a lower cost of meeting its allowable discharge than was estimated in the analysis for the basin plan.

(2) The social and economic analyses in the M/R plan show significant differences in any of the following factors when compared with the estimates utilized in the basin plan; 1) costs of abatement methods; 2) quantity of waste generated; 3) characteristics of the wastes; or 4) critical locations of waste discharges. In such cases it may be necessary to reevaluate the predictions of receiving water quality developed in the basin plan. The analysis procedures discussed in Appendix 2-A, can be utilized for this purpose. Such analysis thus redefines the total allowable waste discharge from the M/R area and updates the basin plan.

APPENDIX 3-A

REGIONALIZATION

Regionalization implies a single administrative agency which plans, constructs and manages all waste water facilities in an area. Certain economies accrue from centralizing the functions of personnel, laboratories and maintenance. Other economies may accrue from planning a configuration of facilities. The agency can plan development of the facilities such that cost effective configurations result. Small treatment plants can be avoided and economies of scale can be realized by construction of the proper facilities. Trunk sewers are evaluated and the total cost of all facilities to the users defines the proper configuration. The overriding constraint in water quality planning is the maintenance of water quality goals. With the advent of reliable and effective advanced waste treatment facilities, it is now feasible to consider maintaining good quality waters in small streams by high performance treatment facilities. The cost effective strategy may be several of these facilities dispersed throughout the metro area rather than one large centralized facility with its attendent trunk sewers.

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CHAPTER 4. WATER QUALITY OFFICE PLAN EVALUATION PROCEDURES

1. PURPOSE. This chapter defines the procedures and criteria for EPA evaluation and acceptance of the water quality management plans. The objective is to insure that the plans developed meet the requirements of 18CFR601.32-33 and provide the basis for up-dating implementation plans to meet water quality standards in a timely manner. The criteria for evaluation must be flexible, giving greater tolerance and subjectivity to interim plans.

2. PROCEDURES. The following procedures are to be used in evaluating plans.

a. The review and evaluation will include:

(1) An evaluation to assure that compatibility with other plans as mentioned below has been covered in the plan and that State clearinghouses have considered any grant applications that are part of the plan. The planning program office at the regional level should have knowledge of the available plans and documents in existence. Examples include land use plans, water resource agency plans, outdoor recreation and other environmental enhancement plans, water quality standards and uses, maps, enforcement conference transcripts, and current economic base forecasts.

(2) An evaluation to verify that the proposed abatement program will meet the required water quality standards or intended water use in a cost-effective manner to provide assurance of reasonable use of investment. This evaluation should determine for example that:

(a) Interacting sources of pollution which may prevent full realization of water quality objectives associated with the proposed project are included in an abatement schedule, or their abatement depends chiefly on practical technological developments.

(b) Water uses are protected. Where these users are not yet established through the water quality standards program, it must be determined that the proposed project will protect those uses identified at the local level.

(c) The objectives of regional waste management systems have been weighed and the proposed project costs represent a reasonably cost-effective approach. This approach should consider treatment

plant and interceptor capital costs, operation and maintenance costs, manpower utilization, and the effects of time, interest rates and risk exposure on the sum of the total costs. All present sources of pollution to be included in the plan, as well as sources to be omitted, and the explicit reasons for omission should be explained.

(d) Important institutional barriers should be described especially respecting regional waste management systems, funding and legislative authority, and proposed solutions or approaches should be presented.

(e) Environmental compatibility of all proposed water quality control programs should be assured. See FWQA Order COM 3200.1.

(f) Manpower factors regarding availability and utilization should be considered.

(3) A verification to ascertain that the items, specified by the regulations and guidelines, are covered for the specific type and geographic area of the plan.

b. If the plan meets the criteria set in Chapters 1, 2, and 3, the responsible reviewer at the regional planning office should prepare a memorandum or standard form for the Regional Director indicating that he has found the plan acceptable: the Governor or his designee should be notified of the acceptance as described herein. The State and appropriate local clearinghouses should be notified by EPA when a plan is accepted.

c. If the plan does not meet the criteria the Regional Director should notify the Governor or his designee of the deficiencies and should arrange a meeting with State and local officials to discuss and assist in revisions.

d. When the plan is accepted, it should be made available to the other regional programs and monitored for accomplishment. The FCO is provided those proposed projects in the abatement program identified as potential construction grant projects along with the project schedule.

3. RESPONSIBILITY.

a. Headquarters will set guidelines and general policy. Where disagreements over plans are not resolved between the State and

regional office, these will be referred to Headquarters.

b. Regions will be responsible for acceptance of plans that meet the criteria set by Headquarters. Regions are also responsible for maintaining close working relationships with the Governor's designee to insure that fully coordinated plans are developed.

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Figure 5-5.1.-Activity Flow

CHAPTER 5. EVALUATION OF CONSTRUCTION GRANT APPLICATIONS FOR CONFORMANCE TO PLANS

1. PURPOSE. This chapter describes the general responsibilities and procedures for evaluation of construction grant applications for conformance to basin or metropolitan/regional plans.

2. AUTHORITY. The Regional Directors are to determine whether proposed projects are in conformance with accepted certified plans.

3. REGIONAL OFFICE RESPONSIBILITIES.

a. The region responsible for the administration of the Facilities Construction Program within a State is responsible for coordinating the evaluations to determine that a proposed construction project is in conformance with basin and metropolitan/regional plans. Assistance will be requested from other regions as required; coordination and control of documents relating to individual projects should be centralized in Regional Facilities Construction Offices (FCO).

b. The Regional Water Quality Planning Office will be provided a copy of the application and supporting documents. Concurrent with the administrative and engineering review by the Facilities Construction Program, the Planning Office will determine whether:

(1) The proposed project conforms with applicable certified basin plans and regional/metropolitan plans described in these guidelines (see Chapter 4) and as specified in 18CFR601.32-33 and that no changes have occurred which would have modified the plan.

(2) The proposed project conforms with the basin priority set forth in the basin plan and the State-wide priority set forth in the State Program Plan.

c. Upon completion of the evaluation, the Planning Office will:

(1) Prepare a report of the planning evaluation and certify that the applicable requirements of 18CFR601 have been met as well as the requirements of EPA Planning Guidelines within 14 calendar days or less from the receipt of the application (or the time that FCO uses for their technical review). Provide a copy for the Facilities

Construction Office files.

(2) In the event that the evalution determines that the application fails to conform to the applicable requirements of 18CFR601.32-3 and the EPA Planning Guidelines, immediately notify the Facilities Construction Office. It is expected that coordination and communication to assure effective action on correcting inconsistencies with proposed projects and plans will be the responsibility of the Planning office.

(3) In the event that efforts to resolve planning inconsistencies at the Regional level are unsuccessful, the Regional Director will refer the application, with recommendations, evaluations and correspondence to the Assistant Commissioner for Operations.

4. HEADQUARTERS RESPONSIBILITY.

a. The Assistant Commissioner for Operations will direct the Division of Planning and Interagency Programs (DPIP) and Division of Facilities Construction and Operation (DFCO) to review jointly all applications referred to Headquarters because of planning deficiencies relative to 18CFR601.32-3 and to make recommendations thereon for his consideration. The Division of Planning and Interagency Programs is responsible for coordination of planning elements with other relevant WQO program elements and will solicit specific comments and assistance from State program and enforcement, and manpower and training elements. The Division of Planning and Interagency Programs will coordinate the preparation of a joint report (DPIP and DFCO) which will be submitted to the Assistant Commissioner.

b. The Assistant Commissioner will consider both Headquarters and Regional Office evaluations, comments and recommendations and will recommend a course of action to the Commissioner.

5. ACTIVITY CHART. An activity flow chart is presented in Figure 5-5.1 outlining the evalution of construction grants applications to conformance with plans.

TENTATIVE ACTIVITY FLOW IN EVALUATION OF FACILITIES CONSTRUCTION GRANT APPLICATIONS

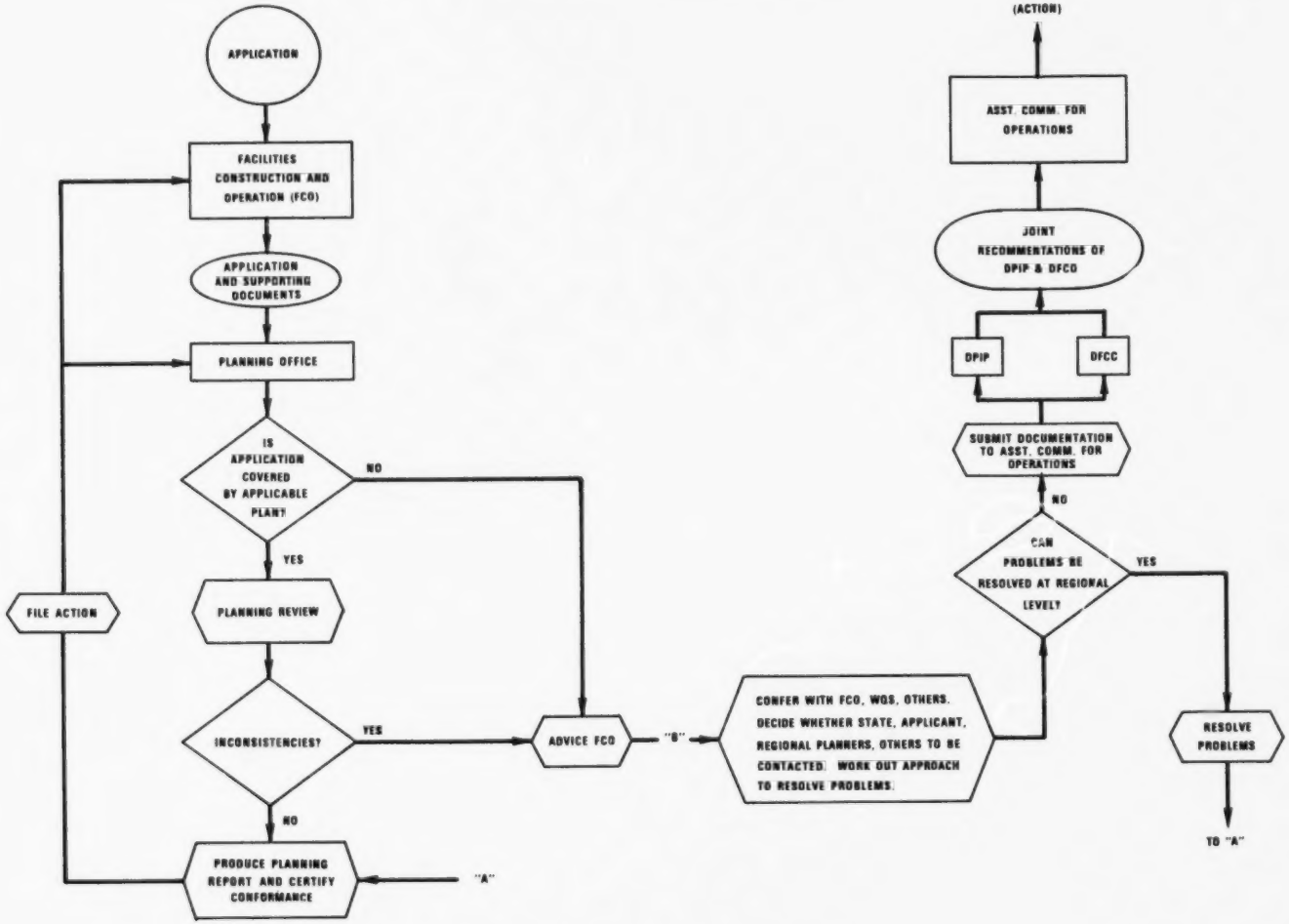

Figure 5-5.1 Activity Flow Chart